

WHAT IS CLAIMED IS:

1. A multi-band radio terminal apparatus comprising:

transmitting/receiving means for processing radio communication signals of a plurality of communication frequency bands, said radio communication signals being used to communicate with a base station;

first frequency converting means for frequency-converting the frequency bands of said radio communication signals between the communication frequency bands and an intermediate frequency band; and

second frequency converting means for converting said radio communication signals between base-band signals and an intermediate frequency signal; wherein:

said first frequency converting means includes;

one reception-sided mixer for converting a reception signal within the communication frequency band into another reception signal within the intermediate frequency band;

one transmission-sided mixer for converting a transmission signal within the intermediate frequency band into another transmission signal within the communication frequency band; and

a first single local oscillator for commonly supplying a local oscillator signal to both said reception-sided mixer and said transmission-sided mixer; and

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said first local oscillator includes:
switching means for commonly supplying an
oscillator output of an oscillator to both said
reception-sided mixer and said transmission-sided mixer
while maintaining a frequency of said oscillator output,
or for either doubling or frequency-dividing the frequency
of said oscillator output to commonly supply said
oscillator output having either the doubled frequency or
the frequency-divided frequency to both said reception-
sided mixer and said transmission-sided mixer in
response to the frequency band of the radio signal used
in the communication between the base station and the
multi-band radio terminal apparatus.

2. A multi-band radio terminal apparatus as claimed in Claim 1 wherein:

said second frequency converting means includes:

a second local oscillator for producing a second local oscillator signal having a frequency which is varied in response to the frequency band of the radio signal used in the communication; and

a mixer for using said second local oscillator signal so as to convert a transmission base-band signal into a transmission intermediate frequency signal.

3. A multi-band radio terminal apparatus as claimed in Claim 2 wherein:

said second local oscillator includes:

a plurality of oscillators, the oscillating

frequencies of which are different from each other; and
 switching means for selectively supplying the
 oscillator outputs of said plural oscillators to said
 mixer.

4. A multi-band radio terminal apparatus as
 claimed in any one of the preceding Claims 1 to 3
 wherein:

 a voltage-controlled oscillator and a phase-
 locked loop are used in said local oscillator.

5. A multi-band radio terminal apparatus
 comprising:

 transmitting/receiving means for processing
 radio communication signals of a plurality of communica-
 tion frequency bands, said radio communication signals
 being used to communicate with a base station;

 first frequency converting means for
 frequency-converting the frequency bands of said radio
 communication signals between the communication
 frequency bands and an intermediate frequency band; and

 second frequency converting means for convert-
 ing said radio communication signals between base-band
 signals and an intermediate frequency signal; wherein:

 said first frequency converting means
 includes:

 one reception-sided mixer for converting a
 reception signal within the communication frequency band
 into another reception signal within the intermediate
 frequency band;

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one transmission-sided mixer for converting a transmission signal within the intermediate frequency band into another transmission signal within the communication frequency band; and

a first single local oscillator for commonly supplying a local oscillator signal to both said reception-sided mixer and said transmission-sided mixer; and

said second frequency converting means includes:

a second local oscillator for producing a second local oscillator signal having a frequency which is varied in response to the frequency band of the radio signal used in the communication between the base station and the multi-band radio terminal apparatus; and

a mixer for using said second local oscillator signal so as to convert a transmission base-band signal into a transmission intermediate frequency signal.

6. A multi-band radio terminal apparatus as claimed in Claim 5 wherein:

said second local oscillator includes:

a plurality of oscillators, the oscillating frequencies of which are different from each other; and switching means for selectively supplying the oscillator outputs of said plural oscillators to said mixer.

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